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ABSTRACT

A survey conducted in the fall of 1996 shows that a majority of community colleges have the following technological amenities: campus computer labs, Internet connectivity, campus computer networks, increased funding for instructional technology, and separate instructional systems departments. The Community College Computer Survey was sent to nearly 1,100 community colleges, and consisted of 7 sections covering network and Internet connectivity, networks and mainframes, computer access and lab usage, computing services, software availability, personnel in instructional technology offices, and funding/institutional planning for computer services. Graphs and charts illustrate responses to the survey, as well as student-to-computer ratios, computer distribution, accessibility, and operation hours for different community colleges. (Contains 10 tables and 18 graphs.) (AS)

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Computer Technology at Community Colleges

AACC Research Brief

AACC-RB-97-2

Gregory Kienzl
Yong Li

American Association of Community Colleges

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AACC RESEARCH BRIEF

AACC-RB-97-2

COMPUTER TECHNOLOGY

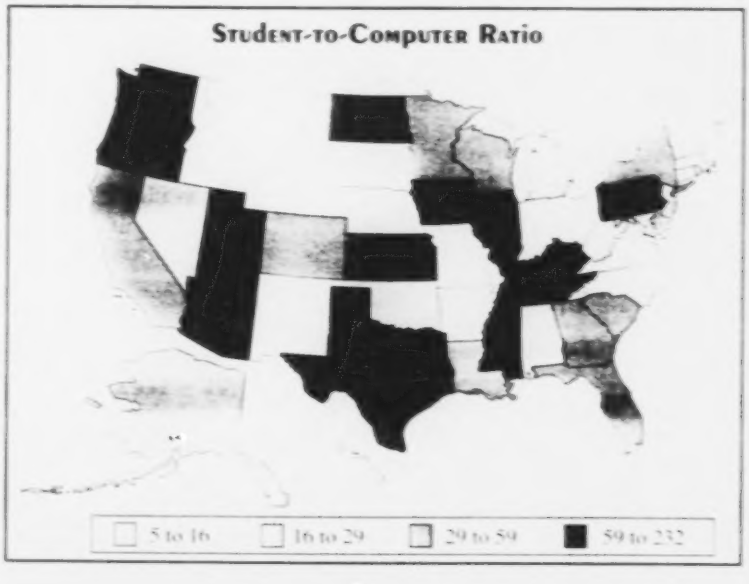
Computer Technology at Community Colleges

Gregory Kienzl and Yong Li

Executive Summary

Community colleges are expanding their computer networks and increasing their technology capacity daily. A survey conducted in fall of 1996 by the American Association of Community Colleges shows:

1. More than 96 percent of community colleges have computer labs available on campus, and the ratio of student to computer at community colleges is 23 students for every computer.
2. More than 95 percent of community colleges are connected to the Internet.
3. Nearly all community colleges (95 percent) indicate that they have a computer network on their campus.



4. From 1994 to 1996, over 86 percent of community colleges increased funding for instructional technology.
5. Eight out of 10 community colleges have a separate instructional systems department, employing an average of eight full-time staff members.
6. On average, rural community colleges have more computers per administrator, faculty member, and student than urban and suburban community colleges.
7. Over half of community colleges (57 percent) currently outsource some or most of their computer needs.
8. Twenty percent of community colleges make computer labs available to the general public.
9. Forty percent of the libraries at community colleges have computers with Internet access.
10. Over half of community college students have access to on-campus e-mail and 65 percent have access to the World Wide Web.

Research Brief on Computer Technology at Community Colleges

Up to this point, there has been little comprehensive information regarding the current state of computer usage and network connectivity on community college campuses. In order to examine these issues, the American Association of Community Colleges designed the Community College Computer Survey. The survey was distributed to approximately 1,300 community colleges in fall of 1996. The survey consisted of seven sections and covered the following issues:

- Network and Internet connectivity
- Networks and mainframes
- Computer access and lab usage
- Computing services
- Software availability
- Personnel in instructional technology offices
- Funding and institutional planning for computer services

Each section assesses key issues such as hardware configuration, Internet accessibility, computer availability, and funding and planning trends for information technology at community colleges.

Description of Survey Responses

Five hundred twenty-seven community colleges responded to the first mailing. After a follow-up survey was released, 293 additional colleges responded for an overall response rate of 63.1 percent. A random selection of 400 non-respondents was contacted and asked several of the key questions from the survey. There were no significant differences between the responses of the non-respondent institutions and those who responded to the survey. This suggests that the results of the survey can be generalized to all colleges. As Table 1 shows, the majority of respondents (54.6 percent) were public, single-campus colleges. Main campuses of multicampus colleges had the second-highest response rate with 18.6 percent. The enrollment and location (i.e., urban, suburban, or rural) of survey respondents were more evenly distributed.

Of those colleges with a mainframe computer, three-quarters have their personal computer (PC) networks attached to the mainframe. Although mainframe computers are mentioned by more than 60 percent of community colleges surveyed, there is no dominant operating system for the mainframe (see Figure 2). Figure 3 illustrates that the majority of computer networks (73 percent) use NetWare as their network operating software, followed by Windows NT (32 percent).

Figure 2 - Mainframe Environment

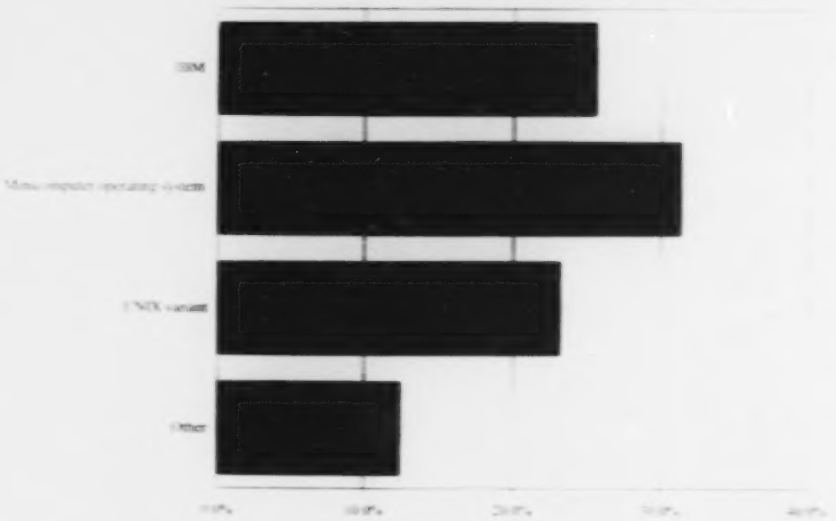
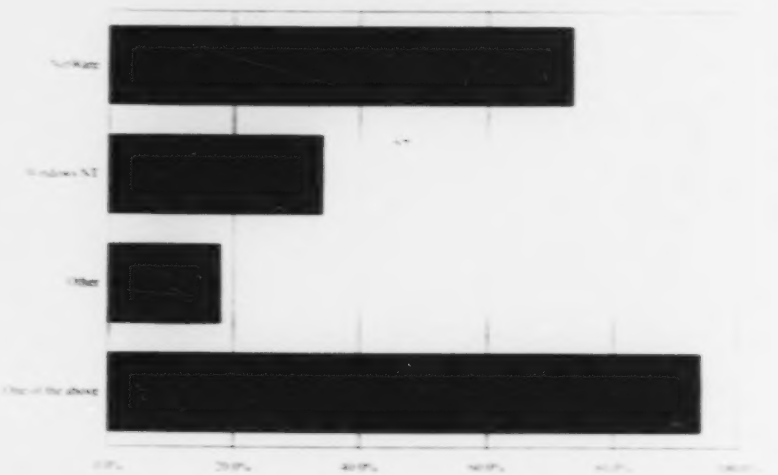


Figure 3 - PC Network Environment



Internet Connectivity

Recognizing the growing importance of the Internet as an instructional and communication tool, a vast majority of community colleges (95 percent) report that they have Internet access. Of these colleges, nearly one-half have a presence on the World Wide Web.

As shown in Figure 4, more than 75 percent of those colleges who are not networked are planning to have a network affiliation within the year. Only 18.7 percent of those colleges who are not networked—or 4.9 percent of overall survey respondents—indicate that they have no current plans to implement any network affiliation.

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Table 1 - Institutional Characteristics of All Community Colleges and Survey Respondents

	Survey Responses		All Community Colleges		
Control of Colleges	**N**	**%**	**N**	**%**	**Response Rate**
Public	743	92.9%	1132	87.0%	65.6%
Independent	47	5.9%	145	11.1%	32.4%
Tribal	8	1.0%	24	1.8%	33.3%
Institutional Type	**N**	**%**	**N**	**%**	**Response Rate**
Single-campus college	437	54.6%	699	53.7%	62.5%
Main campus of multicampus college	149	18.6%	247	19.0%	60.3%
Campus of multicampus college	76	9.5%	117	9.0%	65.0%
College of multicollege district	68	8.5%	119	9.1%	57.1%
University campus offering two-year programs	49	6.1%	88	6.8%	55.7%
District office	20	2.5%	31	2.4%	64.5%
Location	**N**	**%**	**N**	**%**	**Response Rate**
Urban	293	36.6%	480	36.9%	61.0%
Suburban	203	25.4%	325	25.0%	62.5%
Rural	204	25.5%	313	24.1%	65.2%
Not classified	100	12.6%	183	14.1%	54.6%
Regional Distribution	**N**	**%**	**N**	**%**	**Response Rate**
Central	137	17.3%	221	17.0%	62.0%
Northeast	119	15.0%	234	18.0%	50.9%
Northern	166	20.9%	251	19.3%	66.1%
Northwest	67	8.4%	115	8.7%	58.3%
Pacific	107	13.5%	184	14.1%	58.2%
Southern	197	24.8%	298	22.9%	66.1%
College Size	**N**	**%**	**N**	**%**	**Response Rate**
Fewer than 1,000 students	100	13.2%	245	18.8%	40.8%
1,000 to 2,500 students	193	25.7%	322	24.8%	59.9%
2,500 to 5,000 students	185	24.7%	289	22.2%	64.0%
5,000 to 7,500 students	108	14.4%	156	12.1%	69.2%
More than 7,500 students	164	21.9%	287	22.1%	57.1%

Network Connectivity

Networked computers are becoming more and more common on community college campuses. As Figure 1 depicts, more than 95 percent of community colleges are networked and are able to access the Internet. In addition, 95.1 percent of colleges report that they use a local area network (LAN), while 69 percent report having a wide area network (WAN).

Figure 1 - Network Environment

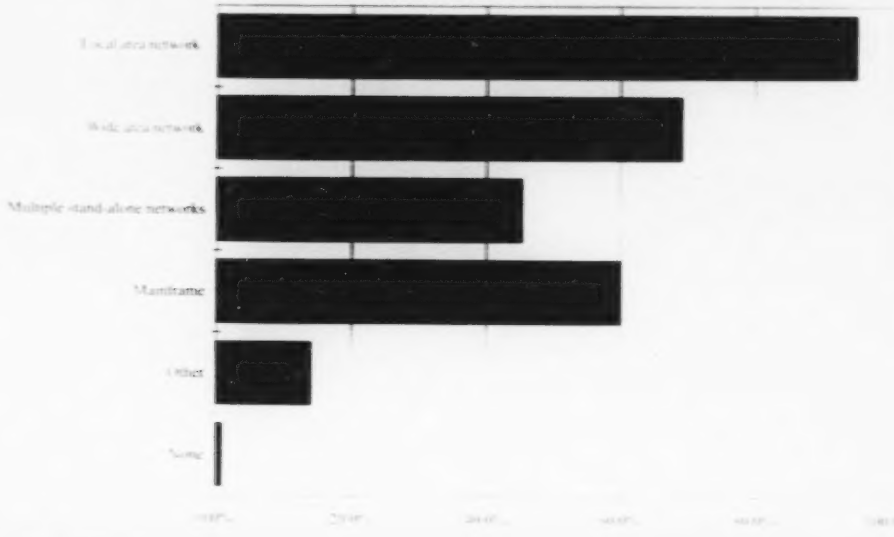
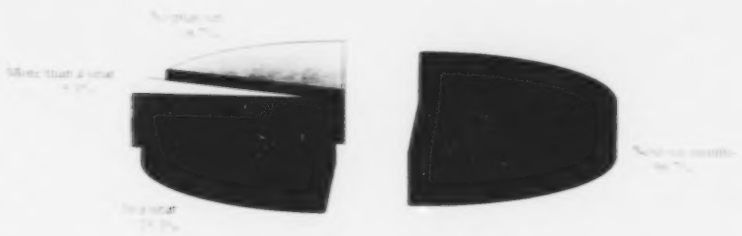


Figure 4 - When College Plans to Have a Network Affiliation



Hardware

According to the survey, community colleges have an average of 603 computers, with the number of machines per campus ranging from 10 to 5,550 machines. Figure 5 shows the overall distribution of computers on community college campuses and Table 2 represents a typical breakdown of terminals and computer types at community colleges. Over 71 percent of the computers are IBM-compatible PCs, while the remaining computers are terminals on mainframes (18.2 percent), Macintosh (9.1 percent), or other types of computers (1.4 percent). Half of the IBM-compatible PCs have processors of 486Mhz or faster, while approximately 6 percent of the machines have processors of 286Mhz or slower. In fact, few colleges have 286Mhz computers, and even those colleges have only a small number of the machines.

Figure 5 - Average Distribution of Computers at Community Colleges

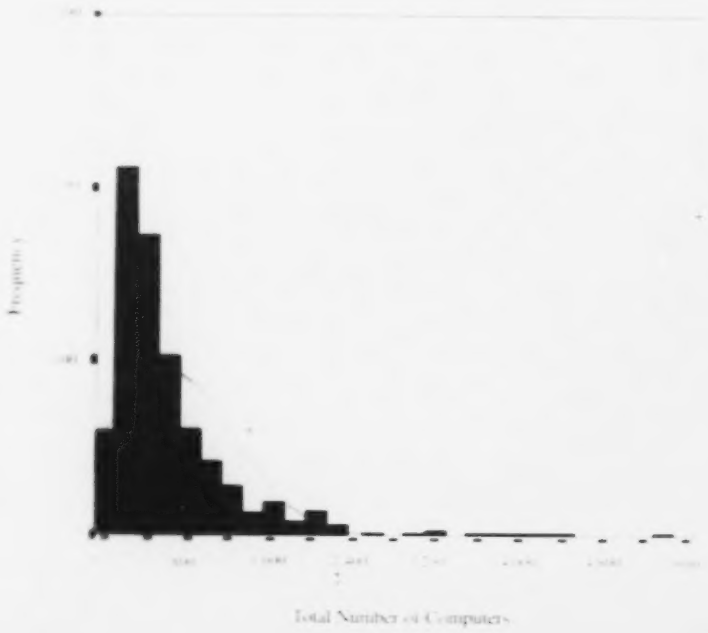


Table 2 - Type and Average Number of Computers

Type of Terminal or PC	Average No. of Computers	% Distribution
Terminals on mainframes	168	18.2%
IBM PCs/compatibles 486 or faster	342	50.0%
IBM PCs/compatibles 386	121	15.4%
IBM PCs/compatibles 286 or slower	66	6.0%
Macintosh	83	9.1%
Other	83	1.4%
Total Terminals or PCs	668	100%

The number of computers on community college campuses differs significantly across institution type and location (see Table 3). According to the survey, main campuses of multicampus colleges have an average of 981 computers, while university campuses offering two-year programs have roughly 40 percent fewer machines. Campuses of multicampus colleges and colleges of multicollege districts have closer to the average number of computers with 566 and 623 machines, respectively.

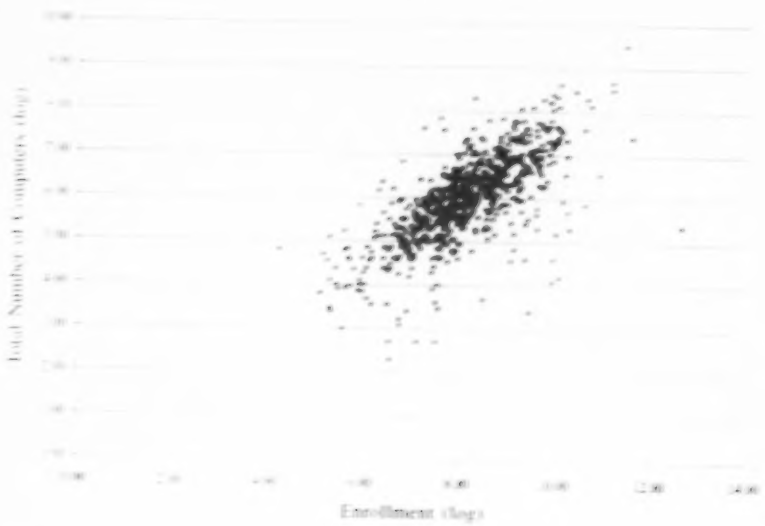
When location of the college is taken into account, urban and suburban community colleges have nearly twice as many computers as rural colleges. However, as will be addressed later, due to their smaller size, rural community colleges have a distinct edge over many urban and suburban colleges in terms of persons per computer.

Table 3 - Average Number of Computers and Enrollment by Institution Type and Location

Institution Type	Average No. of Computers	Average Enrollment
Single-campus college	501	4,664
Main campus of multicampus college	981	7,863
Campus of multicampus college	566	3,467
College of multicollege district	623	8,497
University campus offering two-year programs	386	2,020
Location	**Average No. of Computers**	**Average Enrollment**
Rural	344	2,329
Suburban	669	6,637
Urban	642	6,502
Not classified	991	13,925

There is a positive and direct relationship between enrollment and the number of computers at the college. In other words, as community college enrollment increases, the number of computers at the college increases. This relationship is illustrated by Figure 6.

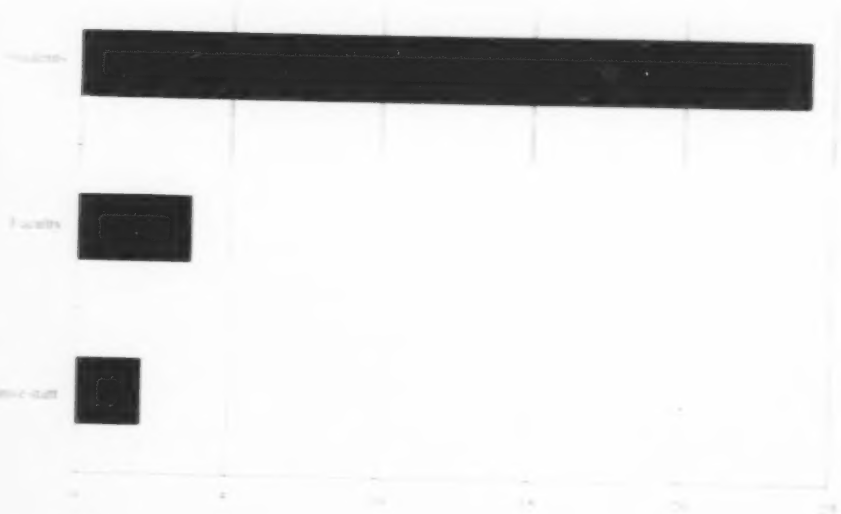
Figure 6 - Relationship between Enrollment and Total Number of Computers



Computer Availability

Figure 7 illustrates the ratio of administrative staff, faculty, and students to computers at community colleges. The availability of computers is greatest overall for administrative staff, with colleges reporting an average of two administrative staff per institutional computer. Faculty have somewhat fewer computers available to them, with approximately four faculty members to each institutional computer. Students have the highest ratio of the three groups, with approximately 24 students for every computer.

Figure 7 - Ratio of Students, Faculty, and Administrative Staff to Computers



In terms of the number of students per computer, urban and suburban have the highest ratios. As shown in Table 4, urban community colleges have an average of one computer for every 25 students while suburban colleges have a computer for every 24 students. Rural community colleges, on the other hand, have the lowest ratio of administrators (1.4 to one), faculty members (2.7 to one), and students (15.2 to one) for each computer. Therefore, even though rural community colleges have on the whole fewer computers, their smaller size allows greater access of administrators, faculty, and students to computers as compared to urban and suburban colleges.

Table 4 - Ratio of Students, Faculty, and Administrative Staff to Computers by Institutional Characteristics

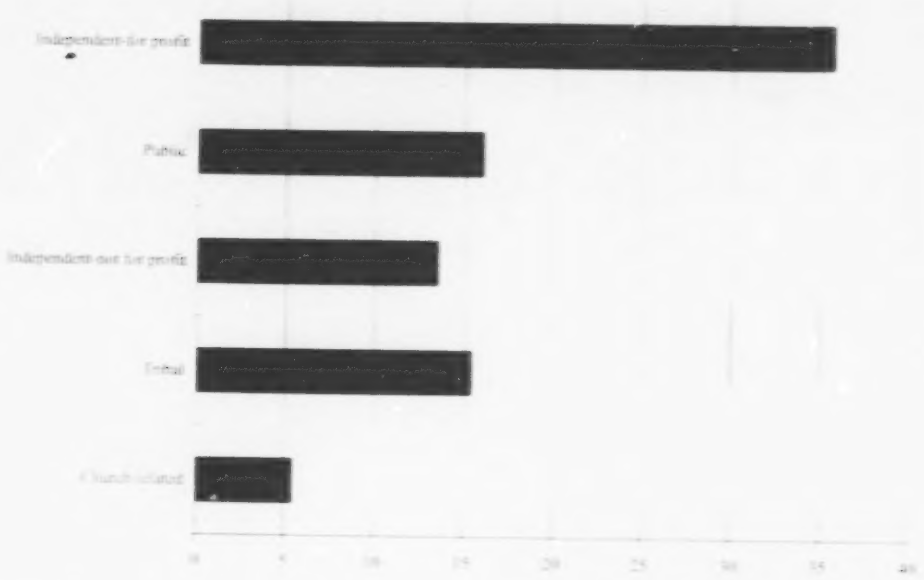
Institution Type	Student-to-Computer Ratio	Faculty-to-Computer Ratio	Administrator-to-Computer Ratio
Single-campus college	22.1	3.1	1.8
Main campus of multicampus college	19.3	3.9	2.8
Campus of multicampus college	19.5	5.5	2.0
College of multicollege district	25.9	5.4	1.2
University campus offering two-year programs	[illegible]	6.8	7.3
Control Type			
Church related	17.7	6.6	1.3
Independent-for profit	7.3	6.0	1.3
Independent-not for profit	63.3	9.5	5.3
Public	22.4	3.9	2.2
Tribal	12.5	2.2	1.7
Location			
Rural	15.2	2.7	1.4
Suburban	23.6	4.9	1.7
Urban	25.1	3.4	2.0
Not classified	23.4	5.5	4.5
Region			
Central	19.3	2.9	1.4
Northeast	24.7	3.9	2.1
Northern	19.1	3.2	1.3
Northwest	21.3	3.2	1.8
Pacific	34.1	8.0	2.4
Southern	18.6	3.2	3.1

Computer Lab Usage

Nearly all of the community colleges surveyed (96.5 percent) note that they have computer labs available on campus. According to the survey, there is an average of 258 computers available in various labs at each college and 16 labs per college are open for student and faculty use. The average number of computer labs per institution is shown in Figure 8.

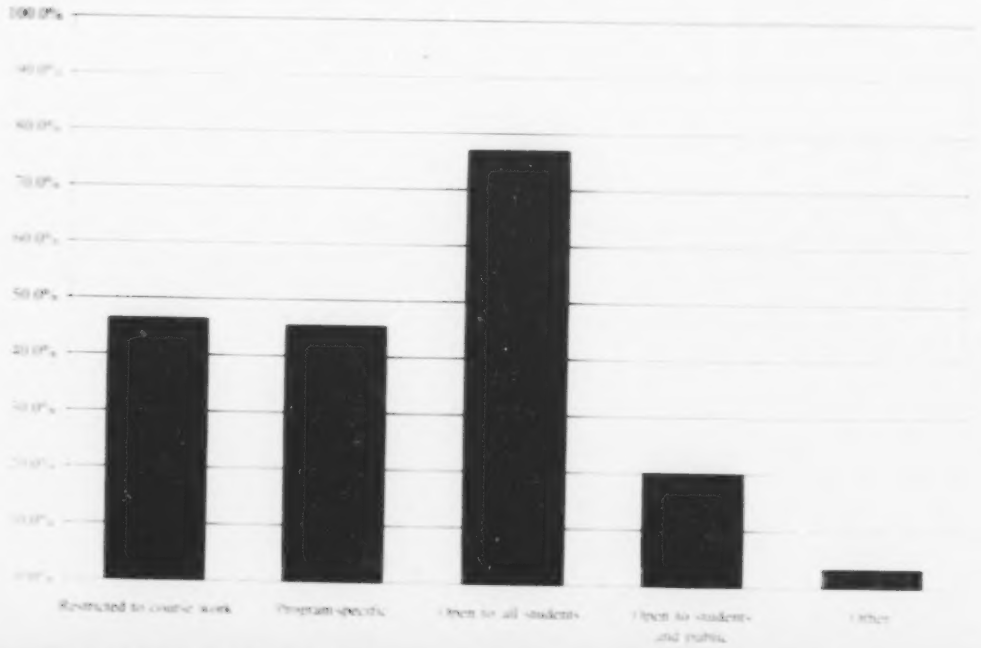
Independent, for-profit community colleges have more workstations available in computer labs than any other type of institution with an average of more than 340 computers per college. Public community colleges have nearly seven more additional computer labs per campus than independent, for-profit colleges but have 70 fewer computers per lab. Tribal community colleges have the least number of computer labs (3.8 per campus), and church-related colleges have an average of 39 machines in their computer labs. Again, college size is the primary reason behind tribal and church-related colleges having relatively low numbers of computers and computer labs.

Figure 8 - Number of Computer Labs at Community Colleges by Institution Type



As Figure 9 indicates, more than three-quarters of the colleges have computer labs that are open to students only, while 20 percent of colleges report that they have computer labs available for general public and student use. Approximately 45 percent of colleges indicate that they have computer labs that are restricted to course work only or have program-specific computer labs open to only those students in the program.

Figure 9 - Lab Accessibility to Students and General Public



The average total number of hours the computer labs are open to students is 13.5 hours a day. Only 15 percent of the colleges offer late-night computer lab hours (10 p.m. to 5 a.m.). For the colleges that offer computer labs to the general public, the average length of time the lab is open per day is 11 hours.

Although these labs are open to the general public, their operating hours are slightly shorter than computer labs open only to students. Table 5 shows the average length of time computer labs at community colleges are open to students and to the general public.

Table 5 - Hours of Computer Lab Operation

Hours of Operation	Students		General Public	
	Avg. Hours	No. of Colleges	Avg. Hours	No. of Colleges
Daytime (8am to 5pm)	8.4	738	7.4	218
Early morning (5am to 8am)	1.2	262	0.8	80
Evening (5pm to 10pm)	4.7	709	3.7	212
Late night (10pm to 5am)	0.8	122	0.3	47
Weekend (Sat. and Sun.)	7.2	615	5.9	163
Daily Total	**13.5**	**738**	**11**	**221**

Another location of computers for student and public use is the library. Computers located in college libraries are used primarily for accessing information such as the card catalog, the library's hours of operation, and general college information. More than 85 percent of colleges have computers in their libraries that are used by faculty and staff for these purposes, while 65 percent of colleges have computers in their libraries that provide this information to the general public.

Fifty-six percent of community college libraries provide computers for general student use, and 73 percent of the colleges provide computers in the library for students to access the Internet. On the other hand, 40 percent of the colleges note that the general public can access the Internet through computers in their libraries, and nearly 32 percent of these colleges have computers in the library that the public can use for more general purposes. Table 6 summarizes the different uses of computers located in libraries at community colleges.

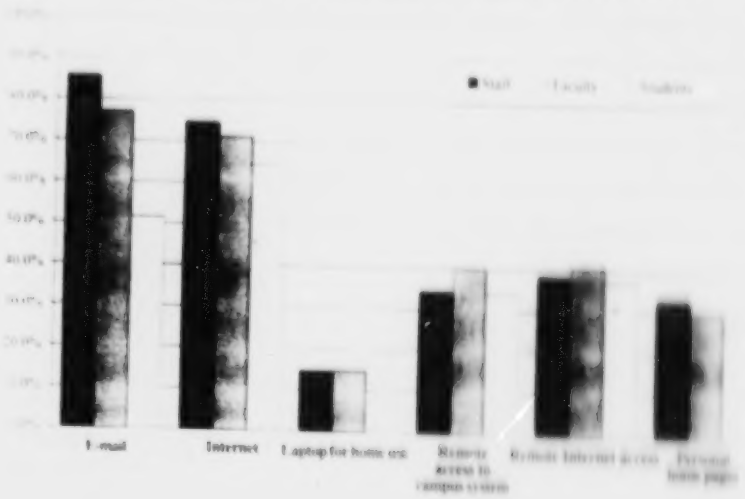
Table 6 - Library Computer Usage

Information Available with Library Computers	Faculty and Students		General Public	
	% Responded	No. of Colleges	% Responded	No. of Colleges
Information only (card catalog)	85.3%	682	64.5%	516
Internet access	72.5%	580	40.1%	321
Course work only	37.1%	297	11.6%	93
General use	36.9%	295	31.8%	254
Other	11.9%	95	8.5%	68

Computing Services

Colleges offer a variety of computing services to staff, faculty, and students. The different types of services available are shown in Figure 10. The most widely available services are e-mail and World Wide Web capability. Administrative staff members have the greatest access to e-mail (85 percent) and the World Wide Web (74 percent), while slightly more than three-fourths of community college faculty have access to e-mail and 71 percent have access to the World Wide Web. Only 52 percent of students have access to e-mail, but 65 percent of community college students have access to the World Wide Web.

Figure 10 - Percentage of Administration, Faculty, and Students Having Access to Computer or Network Facilities

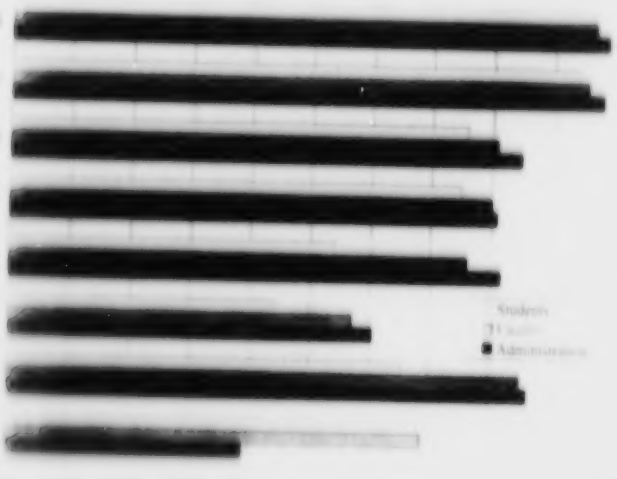


The campus computer system, the World Wide Web, and personal home pages are equally accessible to administrators, faculty members, and students at community colleges. However, the availability of laptops for home use is relatively limited—only 15 percent of colleges indicate that they provide laptops for home use. No colleges report making laptops available for students to use at home.

Software Availability

As Figure 11 shows, almost every college provides word processing and spreadsheet software for students, faculty, and staff. Other packages—such as desktop publishing, presentation, and communication software—are somewhat less available to students, faculty, and staff. Statistical packages are available to less than 60 percent of faculty and roughly 45 percent of students at the colleges. About 70 percent of all responding colleges make computer-assisted instruction available to faculty and students.

Figure 11 - Percentage of Colleges Having Software Available to Administrators, Faculty, and Students



Personnel

Nearly 80 percent of the community colleges surveyed say they have a separate instructional systems (IS) department to handle the computing needs of the college. Of those colleges with separate IS departments, more than 94 percent of IS departments have at least one full-time staff member assigned to the position, while 39 percent of IS departments report having part-time staff. The total number of full-time IS staff members ranges from one person to 93 people, with the average around eight staff members. The largest number of part-time staff members in IS departments is about 70 persons, with the average close to four part-time staff members per IS department. As one might expect, the size of an IS department is closely tied to a college's enrollment—as enrollment increases the average numbers of full-time and part-time IS staff members increase (see Figure 12).

Figure 12 - Full-Time and Part-Time IS Staff Members by Enrollment Size

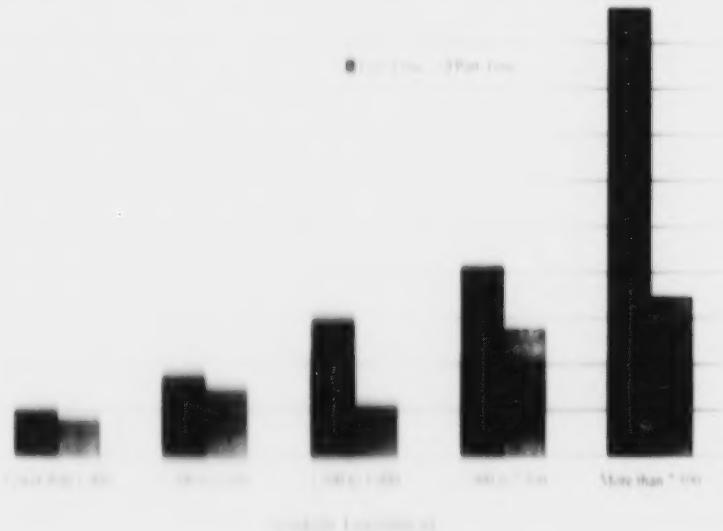
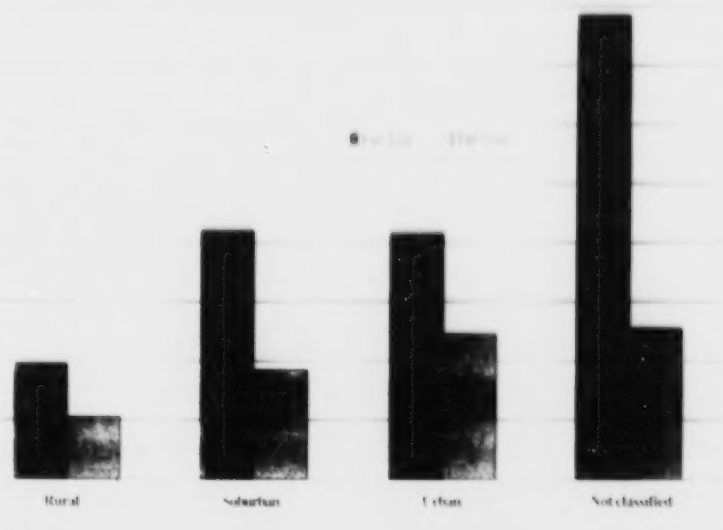


Figure 13 - Full-Time and Part-Time IS Staff Members by Location



Community colleges located in urban and suburban areas have IS departments that are over twice as large as those colleges located in rural areas. On average, rural community colleges have 3.9 full-time and 2.1 part-time IS staff members, while the number of full-time and part-time IS staff members at urban and suburban community colleges are 8.3 and 4.9, respectively (see Figure 13).

Funding and Outsourcing

An overwhelming majority of the respondents (86 percent) indicate that in the last two years, college funding for IT has increased. As Table 7 indicates, more than 80 percent of community colleges have used increased IT funding to improve computer technology for faculty and students' computing needs and to improve the college's computing infrastructure.

Table 7 - Change in IT funding

Change in IT funding	Student Computing	Faculty Computing	Staff Computing	Computing Infrastructure
Funding increased	86.9%	85.1%	80.5%	86.3%
Funding remained the same	11.4%	13.0%	17.6%	12.0%
Funding decreased	1.7%	1.8%	1.9%	1.7%

At the same time, community colleges are recognizing the need to regulate the rising costs associated with computers and related technologies. One of the ways to regulate costs can be to outsource technical support and maintenance. According to the survey, 57 percent of the colleges report that they outsource most or some of their computing needs. However, as Figure 14 illustrates, nearly 43 percent of colleges indicate that they do not outsource at all.

Figures 15 and 16 show how reliance on outsourcing is related to institution type and college enrollment. Independent community colleges and church-related colleges are more apt to outsource computing needs, while tribal and independent, for-profit colleges are the least likely to use outside vendors to provide computer maintenance and technical support. In addition, the degree of outsourcing practiced by the college is somewhat related (albeit inversely) to the college's enrollment. More specifically, 9.1 percent of colleges with fewer than 1,000 students outsource most or all of their computing services, while only 3.1 percent colleges with more than 7,500 students indicate that they outsource most of their technological needs.

Figure 14 - Extent of Outsourcing of Computer Needs

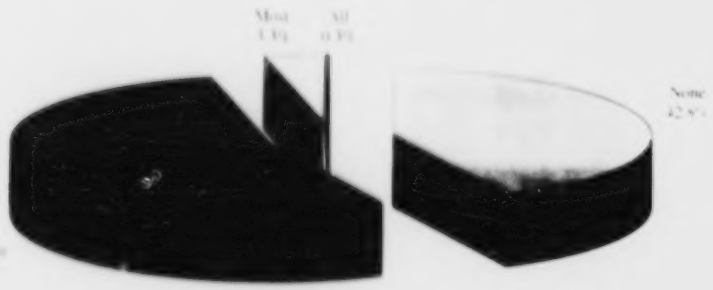


Figure 15 - Extent of Outsourcing by Institution Type

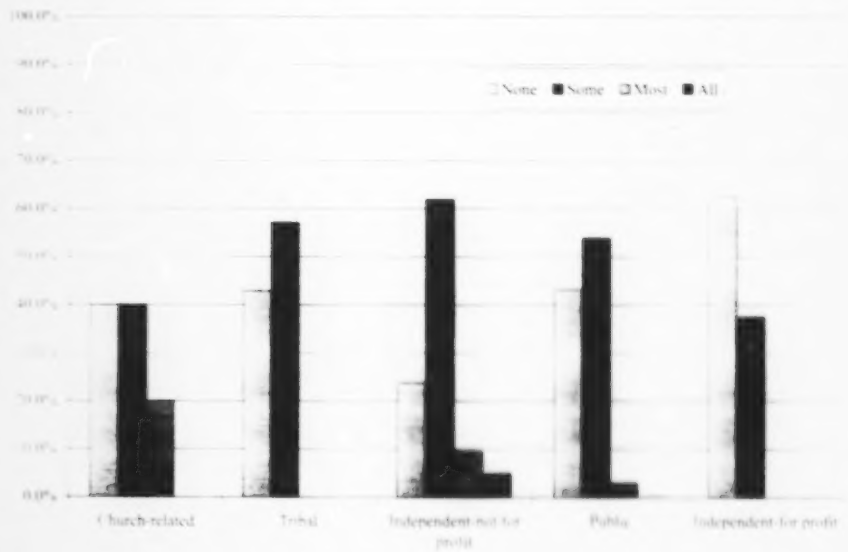
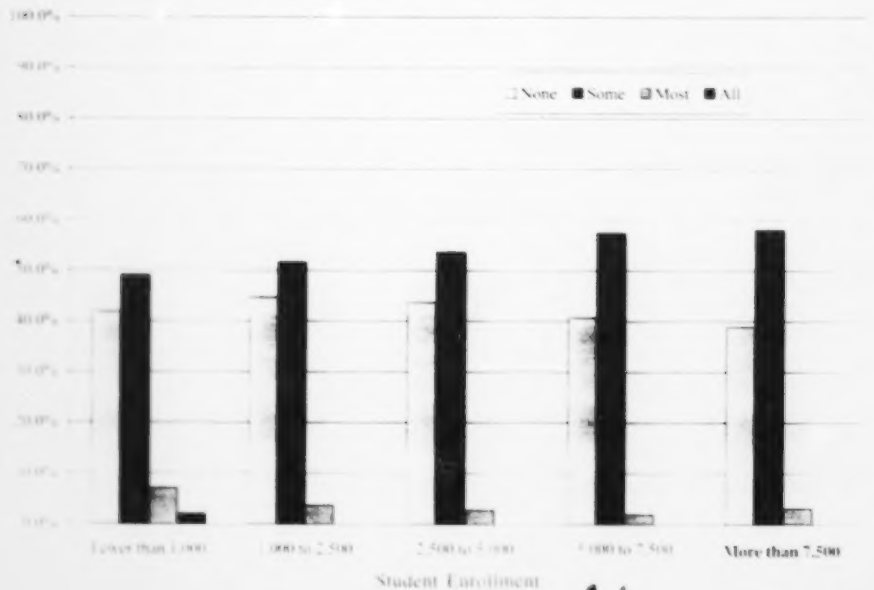


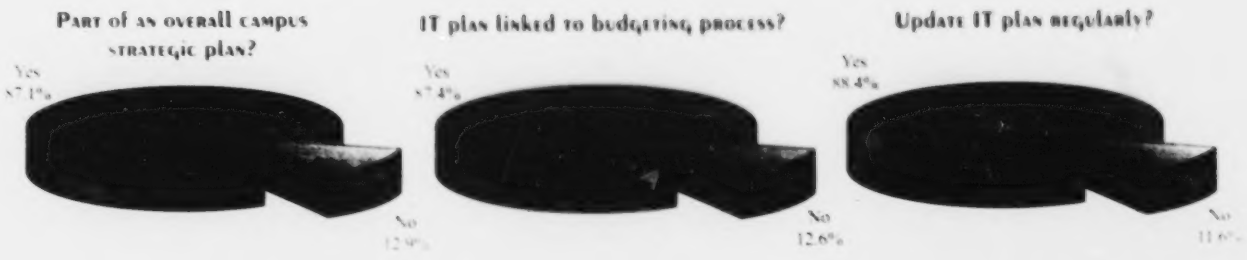
Figure 16 - Extent of Outsourcing by Enrollment



Institutional Planning

Slightly less than half of the survey respondents note that their college has an IT strategic plan. Of those colleges with an IT strategic plan, slightly more than 87 percent note that their plans are a part of the overall campus strategic plan. Nearly the same percentage of colleges indicate that their IT plan is linked to the institution's budgeting process (87.4 percent) and updated at least every two years (88.4 percent). Figure 17 shows the similarity of responses from community colleges who have strategic IT plans.

Figure 17 - Does your college have a strategic instructional technology plan?



For the most part, whether a college has an instructional technology strategic plan does not depend on the type of institution or its location (see Table 8). The one exception is university campuses offering two-year programs, with only 28.9 percent of these institutions reporting that they follow an IT plan. On the other hand, college size appears to be a good indicator of whether a college has an IT plan. For example, 34 percent of small colleges (those with fewer than 1,000 students) have an IT plan, while 55.1 percent of large colleges (those with more than 7,500 students) indicate that they have a strategic plan for technology.

Table 8 - Percentage with IT Plan by Institutional Characteristics

Institutional Type	Has an IT Plan	Does Not Have an IT Plan
Single-campus college	49.3%	50.7%
Main campus of multicampus college	54.2%	45.8%
Campus of multicampus college	47.9%	52.1%
College of multicollege district	53.1%	46.9%
University campus offering two-year programs	28.9%	71.1%
Location		
Urban	51.3%	48.7%
Suburban	51.8%	48.2%
Rural	44.3%	55.7%
Not classified	47.8%	52.2%
College Size		
Fewer than 1,000 students	34.0%	66.0%
1,000 to 2,500 students	46.9%	53.1%
2,500 to 5,000 students	54.7%	45.3%
5,000 to 7,500 students	48.5%	51.5%
More than 7,500 students	55.1%	44.9%

Suggested Readings

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Q:

Where do almost half of all undergrads go to college?

A:

Community Colleges

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Call your nearby community college for more information.

For further information on the Community College Computer Survey results or related information, contact

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